

Precambrian evolution of the Tirek Terrane (Hoggar, Algeria): Evidence for the existence of an Archeo-Paleoproterozoic continent in the western part of the Tuareg shield

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New geological mapping of the Tirek Terrane (western Hoggar, Algeria), and petrological, geochemical and geochronological study show the existence of an orthogneissic basement having a composition of TTG, dated at 1965 ± 18 Ma (inherited zircons give Paleoproterozoic and Archean ages, 2006 to 2771 Ma). This basement is topped by a metasedimentary unit composed of sillimanite-bearing quartzites and metapelites. The zircons of these metapelites indicate a range of ages from Archean to Proterozoic (the youngest age is 2050 Ma). Sills of alkaline orthogneisses that cut across previous lithologies, have been dated at 1810 ± 38 Ma (inherited zircons give an age of 2610 Ma). They indicate a deposit age for metasedimentary series between 2050 and 1810 Ma. Migmatitic granitic-granodioritic batholith, which occupies 50% surface of the study area, has chemical composition with a subduction affinity. It is dated at 663 Ma (inherited zircons dated at 1800 and 1969 Ma).

The high-temperature - low pressure Pan-African metamorphism that affects the studied area indicates a clockwise P-T path with a peak at 750-800°C and 6 kbar followed by decompression, then decreasing temperature (600 °C to 4 kbar). The dating of this metamorphism (U-Pb monazite) gives an age at 578 ± 5 Ma contemporary of the emplacement of the syn-kinematic granites in the same terrane. The comparison with the western terranes of the Tuareg shield suggests that Tirek, In Ouzzal (IOGU), Iforas granulite unit (IGU) and Kidal terranes constitute a same Archeo-Paleoproterozoic Continent. Currently, in the central part of this micro-continent, outcrops the Archean lower crust which has been remobilized in the Paleoproterozoic, and on both sides of it, outcrops the Palaeoproterozoic crust remobilized which has been in the Neoproterozoic.

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